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Bachelor´s Thesis
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ABSTRACT OF
BACHELOR'S THESIS

Author: Valtteri Saarinen

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Objectives

The main objectives of this study were to explore and identify the ways that directives set by the European Union affect the company operations in its sector. The sector in question in this research is the renewable energy production, and in detail the renewable diesel oils. Also, one of the objectives is to identify how, and with which actions the companies can benefit from the regulatory environment.

Summary

The phenomenon of moving towards more environmentally friendly alternatives for energy sourcing in transportation sector. Especially the development in European Union with the large-scale regulatory business environment has been encouraging to meet the targets in utilization renewable diesel as energy source in transportation. The directives offer an incentivized marketplace for the producers of renewable diesel and continues to do so in continuing manner. The transportation sector is in a transformative situation and so is the market. In this thesis, a combination of qualitative research and existing literature were used to examine the topic. Qualitative interview was conducted with a specialized expert of implementing EU directives on renewable energy to Finnish legislation and how it affects the sector in question. Also, a market leading company of renewable diesel sales was examined through publications and press releases to form case like scenario in forming a market outlook.

Conclusions

The research concluded that companies in business of renewable fuels have certainty of growth up until 2030 in the government boosted sector. The incentives to invest are fixed to future which decreases the uncertainty of the emerging market. The predicted growing demand is combined of trend of increased use of environmentally friendly alternatives, and the obligations that are monitored and by EU member states. The market is not only fixed on end user demand but also the other fuel distributors, since they do not necessarily have enough capacity to meet the demands of obligations and have to buy from competitors in fear of fines.

Key words: energy policy, fuels, energy, european union, incentive plans, investment incentives, uncertainty

Language: English

Grade:

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1. Introduction

1.1 Background

Over the recent years environmental awareness has gained more and more friction in the discussion of industrial development. The continuous growth in economies has increased the emissions to a level which is not sustainable. Sustainability has become the buzz word of this century and business models built on it have emerged to even the sector of oil refineries and fuel distributors. Transport sector has many alternatives to reduce its emissions from electricity to hydrogen and other alternative substances that may be as fuels. One of the alternatives is biobased fuels, with the most developed so-called advanced biofuels. The advanced biofuels, that for instance Finnish company Neste produces, can reduce the greenhouse gas emissions up to by 90%. Transportation is responsible for most of the emissions but with technological innovation and research the effects on environment can be scaled down. To reach the situation of encouraging environment for investments in this sector, the governments need to give a level ground in the competition between renewables and traditional energy sources.

The climate change is worldwide problem and the nations around the world have committed to reduce its emissions. The European Union has set regulations in the form of Renewable Energy Directives to ensure that renewable alternatives will reach larger proportion of energy production to mitigate the carbon emissions and lessen the effect of climate change. To reach reductions across the states of the EU, the directives need to offer feasible options for companies to operate by offering incentives or setting obligations for companies.

1.2 Research problem

The regulations set by EU give provisional chances to make profits and have larger margins if the companies are innovative and can defeat competition by research and development. The problem with regulations set by EU considers the slow pace of rising the limits to sufficient levels to match the demand of the public for environmental products. While the limits are low, the producers are not likely to sell as high-volume paraffine diesel oil that would be bought if given choice, just because the margins and volume in regular diesel are higher.

The regional variation in the levels that are required from companies is sizable. For example, the government of Finland has set target for 30% renewable energy sources for all energy used for road transportation in opposite of 14% requirement for EU area in total. Examples in Finland show that the tighter regulations set, and more indulgent incentives offered for the companies there can lead to world leading and flourishing sector of renewable fuel production.

1.3 Research questions

EU directives as the area of analysis, the research questions are as follow:

1. How efficiently EU directives affect the industry standards?
2. Are the directives and regulatory actions enabling the operators to find feasible opportunities to grow their sales in their section of end-users?

1.4 Research objectives

The objectives of this research are as follows:

1. To identify the ways in which directives affect the company operations.
2. To identify how a company Neste is able to exploit the regulations and turn it into advantage and draw conclusions to be used in the scale of industry.

1.5 Definitions

Renewable diesel: A renewable fuel that has the combustion elements that simulate the elements of traditional diesel fuel. Renewable diesel is produced from feedstock such as fats and oils by “hydrodeoxygenation reaction at elevated temperature and pressure in the presence of a catalyst” (Knothe, 2010).

Biodiesel: In opposition of the renewable diesel discussed previously, biodiesel does not have the capability to simulate the technological properties of traditional diesel and therefore, is not able to be mixed in the same fashion as renewable diesel.

Renewable Energy Directives: The directives put in place by the European Union are a piece of larger package of energy and climate legislation, which is designed to offer a framework for the member states to reach the community targets for greenhouse gas emission reductions. The first of two Renewable Energy Directives came into effect in 2009 and the second one in 2018. The first gave the emission reduction targets for the years 2010 till 2020 and the second one from 2021 till 2030.

Ministry of Economic Affairs and Employment: A Finnish ministry that is responsible of implementing the framework provided by the EU to the legislative environment of Finland. They study the businesses and their capabilities in Finland and decide the incentives and other supporting governmental tools for the development of business in the constrained environment caused by the regulations of Renewable Energy Directives.

2. Literature review

2.1 Introduction

“Business aiming to serve a common good is challenging because people rarely pay for public interests without direct private gains unless the social sense of urgency generates public demands” (Krozer, 2014) The market for renewable energy sector became monetarily equivalent to car sales in 2010, reaching USD 499 billion. (Krozer, 2014) The research literature considers the policy implications set to the development of paraffine diesel oils, which falls into the category of renewable oil products. (McCormick, R. and Alleman, T. 2016). The development of, for example, Neste NExBTL, is in the expansion/growth of the innovation process which means that the research and development of the product are in the final stretch and policies set by EU and national actors are in the center of attention in terms of how the market will develop. (Chiaramonti, D. and Goumas, T., 2019) The degree in which the market is anticipated to shift towards using more of the renewable paraffin diesel oils is the main focus of this research, and the literature review is conducted to deepen the understanding of the existing policies and the implications on the market. The conceptual framework of the thesis includes the actors and tools that are used to build existing regulation and suggests how the market will react in different scenarios. The framework is used as guidelines in the case of Neste and its operations in the sector of renewable diesel fuels.

Firstly, the literature review studies collectively the ways in which comprehensive policies of promoting renewable fuels to mitigate the climate change should be set and developed by larger entities, such as the European Union, or in some examples the US. This section studies articles that evaluate the efficiency of certain environmental sustainability-themed regulations by policymakers, such as the EU´s Renewable Energy Directives (RED and RED2) introduced in 2009 (2009/28/EC) and 2018 (2018/2001/EU) respectively and Renewable Fuel Standard (RFS) from the US to reach the end-results wanted. The importance of targeting the regulations into certain

sectors to ensure the most effective regulatory actions is also discussed in the side of the significance of company involvement in the difference-making. The importance of effectiveness is based on the cost-benefit scales of standards or regulations set. Effective regulation also “involves the design of policies, rules and laws that are thoroughly supervised and supported by the credible threat of enforcement to produce an intended or expected result”, which in this case is the reduction of carbon emissions from the transportation sector (Radia, 2020). The directives are discussed incorporated with cases from Europe such as German wood-based bioeconomy, biorefineries, and uncertain and emerging markets.

As the topic of this thesis is highly dependable on the characteristics of RED and RED2, the sustainability guidelines and the frameworks are discussed in-depth to be able to assess the impacts on the industries and the market in which the companies are operating in. The assessments are conducted in terms of whether the directives and regulatory actions are enabling the operators to find feasible opportunities to grow their sales in their section of end-users or do they face barriers that do not encourage the companies to innovate and invest in R&D to reach the dominant role in that sector in question.

Business model activities describe the companies´ process of adding value to their processes and are able to “enrich the strategic management discussion because they can link important streams of the literature, including the resource-based view (RBV), the demand-side perspective, and the dynamic capability view” (Ritter and Lettl, 2017). To build on the regulation restrictions or opportunities that emerged, the most suitable business models in renewable energy are discussed from the point of view of investors who represent the predictors of competitiveness of companies that operate under the new regulations. The models are later in the study assessed from the point of view of Neste. Neste was chosen to be studied because of its nature of being the largest producer of renewable diesel form waste and residues (Advancedbiofuelsassociation.com, n.d.).

The market for advanced diesel oils, such as the paraffine diesel oils, in Finland is divided between two producers, UPM and Neste. UPM produces product named BioVerno and Neste produces Neste My Renewable Diesel. Also, in Finland ST1 is a producer of biofuels in form of bioethanol, which is concerned as first generation biofuel. The first-generation biofuels are not as flexible in use of customers since the mixing capabilities with traditional diesel are not as good as advanced ones (Knothe, 2010). In Finland, Neste is by a substantial margin the largest producer of renewable diesel. They dominate the market with a global annual production capacity of 3 million tons (Renewable fuels, 2020) followed by UPM with 120 million liters annually which is equivalent to approximately 1000 tons of renewable diesel (UPM Biopolttoaineet, 2020).

The models are implemented from sustainable approach. “A business case for sustainability achieves economic success through (and not just with) the deliberate and voluntary management of ecological and social issues” (Lüdeke-Freund et al., 2017). Also, “corporate sustainability takes into account the risk of negative business impacts on the natural environment and society as well as the challenge of surviving as an organisation in partly radically changing ecological, social, and economic contexts” (Schaltegger and Burritt 2005). With such information, the comparison of Neste´s business models can be made, and suggestions for future conduct given. Since the environmental sustainability of products, which include the effects of supply chains, production energy´s origin, and the use of land, has a pool of factors that need to be considered. The promotion of the use of biobased oils especially in transportation in inter-Europe transportation has created a dilemma between the use of land for utilization of food or ingredients for fuel. The uncertainty in the allocation of land for each use brings the phenomenon into the sector that uses plants in their products (European Comission, 2017).

2.2 Developing a comprehensive and efficient policy

“Good regulation plays a key role in energy-saving and emission-reduction, which is the key to standardize the behavior of the government and enterprises.” (Long and

Yu, 2009) The goal of regulations and directives empowering environmental sustainability is to mitigate the effects of excess pollution and unwanted industrial behavior. The first step into wide-scale regulation in the EU was the 2009 Renewable Energy Directive which set mandatory targets for emission reductions and involved the promotion of renewable energy sources (2009/28/EC). The RED (2009) specifies renewable energy targets for each of the member nations to be achieved in 2020. The EU-wide regulatory action aimed to give each member state guidelines to apply own legislation the targets in mind. The process would be monitored by the EU in periods of two years with the aim of a 20 percent renewable-based portion of whole energy production and 10 percent of transportation. (2009/28/EC) The following directive was set to prolong the effect of RED to 2020s and revise the targets to 32 percent renewable energy production and 14 percent of transportation. (2018/2001/EU) Finland´s targets follow the guidance of EU directives. The Ministry of Economic Affairs and Employment (MEAE) decided to increase the share of transportation biofuels to 30 percent of total energy sources. (Ministry of Economic Affairs and Employment, 2017)

Pierre Cloutier de Repentigny (2016) discloses that the principles of sustainable development relevant in the RED case within biofuels are principles of equity, and principles of integration. The principle of equity is described as it “would lose its meaning if equity for one generation was achieved at the expense of another.” (Cloutier de Repentigny, 2016) Another dimension, the principle of integration, is to demand policymakers to integrate environmental protection when considering economic or social reforms. The two-way influence between innovation and development and the economic, social, political, and organizational factors is evident in integration across the board. Innovations can cover both organizational process innovation and product and service innovation. (Purkus et al., 2018) However, the innovation in the process of enforcing the policies is not sufficient compared to wider transition strategies and institutional change, for example, by improving the existing factors to stimulate consumers and voters towards demanding thorough policy transitions towards environmental sustainability. (Purkus et al., 2018)

As the policies in question, renewable energy directives, and renewable fuel standards are developed as an answer to the international climate agreements, such as The Paris Agreement (United Nations, 2015), the pressure on the change of transportation is conspicuous. To achieve the desired results, Hunsberger et al. propose that targets require clear, and specific policies in each area, but also coordination, by monitoring capacity to outcomes and mechanisms to enforce regulations. The extent to which it is achievable for renewable biofuels remains open. They argue that it is crucial to loosen expectations by theme, scale, time frame, and social characteristics of people affected. It is important to develop metrics that are meaningful to specific policy aims, which help anticipate challenges likely to arise with multi-layered biofuel agendas.

2.3 Co-operation in development

In its current state, the guidelines given by EU states are a burden for the companies rather than a tool of support to new developments such as innovative biorefineries or productions of biobased materials (Maes, D. et al., 2015).They conclude that the guidelines are too static and should, in turn, have more holistic characteristics to reach a more precise view. To develop more achievable standards and binding limits, must the factoring parties be taken equally under consultation to achieve the consensus on the feasible options. Existing factors include four essential parties of state operations, companies, government, universities and financiers.

Lundberg and Andersen (2012) conclude that the three former actors should more actively involve each other in the process of developing the processes and operate in a network of resources. They recognized in a study conducted in a Swedish setting that by integrating the resources in new ways would develop outside-of-the-box activities. In conjoint with the Swedish example, a study conducted in Belgium, Germany, Norway, Portugal and Switzerland shows similar effects on cooperation, in this case between companies and universities in terms of innovation. (Arvanitis and Bolli, 2009) They recommend moving towards “more intensive knowledge and technology transfer between enterprises and research institutions across national borders that could be further enhanced by technology policy” (Arvanitis and Bolli,

2009). The environmental policies ought not to be viewed only as the limiting factor, but those should provide the tools of finding the way around restrictive actions by R&D.

2.4 Effect of Regulatory Actions on Companies

The regulatory actions of governments aim to cut some unwanted industrial behavior to contribute to a more socially or environmentally desired route. Still, it has been argued that while obeying the regulations and limits set, the costs are likely increased, or freedom of business is restricted. (Palmer, Oates and Portney, 1995; Jaffe, A. and Palmer, K., 1997) To weigh in, Porter and Linde (1995) discuss that “in this static world, where firms have already made their cost-minimizing choices, environmental regulation inevitably raises costs and will tend to reduce the market share of domestic companies on global markets.” They add to the verdict that policy focus should be on lessening the trade-off between the competitiveness of companies and the environment. However, even if the trade-off in adapting to the new regulatory environment raises the production costs of goods, it increases the level of innovation in the sector and gives an edge for the most innovative companies that draw Business-to-business customers that follow the trend on moving towards sustainable suppliers. (Lanoie et al., 2011) The economic and financial effects of environmental regulation face the main challenge of enhancing the knowledge in understanding of the link between policy design and impact. (Pham, Ramiah and Moosa, 2019; Dechezleprêtre and Sato, 2017)

Still, amongst the uncertain markets, “the success of innovation depends largely on the simultaneous and successful interplay of supplying new products and services and the buying behavior of the consumers”. (Blind, Petersen and Riillo, 2017) As an emerging market, the demand for certain products, such as biobased paraffine diesel oils, may be affected by the heterogeneous technological atmosphere or erratic consumer behavior. However, the interchangeable nature of paraffine oils with traditional diesel oils may mitigate the problem of having to invest and change the power terrain of the mode of transportation in question.

As an emerging industry, the renewable energy sector requires supportive actions to ensure and enhance the competitive advantages in the international market field. Industry-leading innovation and cost reduction capabilities attract investors, hence equity, but on the other hand, the most attractive quality in the business model is targeting the customer intimacy and focusing on customer service. (Loock, 2012) Loock discusses that the incentives supporting technology and production should be shared with the services that distribute and disseminate the innovation by incentivizing for example the transaction costs.

Furthermore, “As capacity expansion models are not without serious challenges since RFS implementation has proven more challenging than originally anticipated. Under this additional uncertainty, it is difficult to envision large investments in production capacity for new fuels.” (Christensen and Siddiqui, 2015) The uncertainty is slowing factor in the development and utilizing new technologies in one of the largest industries in the world. The average refinery output of diesel products in European countries was 40,1% which is equivalent to 256.7 million tonnes per year in 2016. (FuelsEurope, 2016) To compare, the global production of biofuels is 88 million tonnes in 2018. (IEA, 2018)

The investors and stock market operate with predictions of the industries and economy. Regulations tend to tamper with the business models and revenue sources by adding arbitrary costs caused by taxes and lost sales. Also, as the companies set the targets of their environmental actions by the regulations or standards given, the long hauling and high-flying targets may not be met in the targeted time frame. It will result in unethical behavior, hence the Volkswagen Dieselgate (Wood et al., 2018), and a reputational dent in minds of the equity providing investors and the consumers. Studies indicate that consumers´ likelihood to make a purchase and repurchase is highly dependable on the reputation of the company. (Wang et al., 2010;) Wang et al. also fine down that significant reputational advantage is obtained by only 15% of the highest performers.

Consumers and the purchasing behavior of theirs will also be affected by the price changes of the more developed product compared to traditional diesel fuels. The MEAE anticipates that the prices of renewable diesel oils, with mixing concentrations of 30 percent, will be EUR 33 cents more expensive. MEAE uses in their report the With Additional Measures (WEM) – scenarios to forecast the economic effects of shifting towards the targets set. The private level of consumption is predicted to be 0.4 percent below the level without these additional measures, which means that the buying power will be lesser with current targets. On the contrary, a study conducted in the US states that “even if the consumption of E85 [blended petrol] is severely constrained in future years, it is unlikely that retail fuel prices will change dramatically. This is important from a political risk perspective, as high pump prices have been a point of contention in the discussion”. (Christensen and Siddiqui, 2015) The products are not interchangeable, but the utilization and nature of blending fossil and renewable fuels is a common factor to justify the comparison.

2.5 Conclusion

The concluding statement of this topic, how the regulations affect the development of the market for diesel products, can in a narrow sense, be that regulations set boundaries but also provide grounds for improvements in product and service innovation. The companies that manage to excel in the industry of renewables will have the edge in the competition that is boosted by regulating activities. Companies face challenges with the regulations and standards particularly in the markets that are under the influence of uncertainty. How the industry of renewable diesel fuels is going to turn out to supply sufficient amounts of fuels to power such a large portion of transport as has been targeted is still under debate. Policy design has been encouraging in the forceful atmosphere of mitigating climate change. Still, the level how efficient the emission reductions have been, is to be seen periodically and the trend of preferring tools for economic boosting over reducing for example use of fossil fuels, i.e. coal plants in the US, lay a shadow on how long and effectively the policies on using renewable diesel fuels will be enforced.

The power of changing behavior in the consumer base is not binding only for the governments but also how much the companies and consumers want to profile themselves as contributors in the climate problems. The contribution of companies is not relatively widely studied and information is limited so that the sector needs additional research so that the policies and supporting activities can be designed accordingly.

2.6 Conceptual Framework

The conceptual framework is developed on the basis of the model of "endogenous technological change based on the learning mechanisms and renewable energy-related policies" introduced in a study by Kim K., Heo, and Kim Y. (2015) The model describes how obligations, taxes, and incentives affect the dynamics of market opportunities. It describes how the development of policy and what stages are involved in how the policy affects the market and the actors in that market. The model used in this research uses the existing factors and implements it to the case of market development from the point of view of Neste.

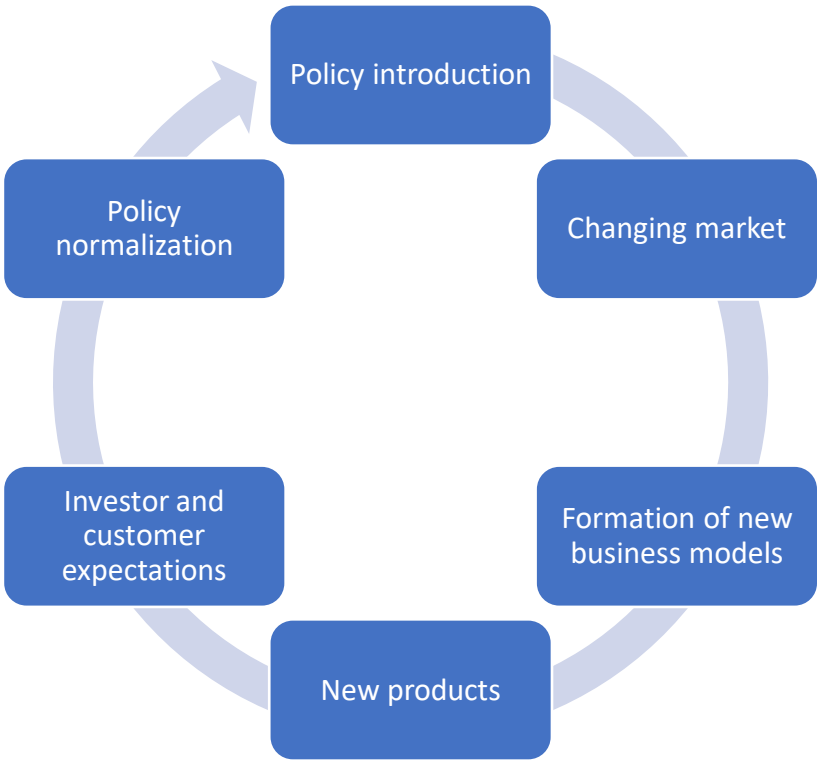

Figure 1 Conceptual Framework in Steps in Changing Regulatory Environment

The model follows the flow of phenomena and the actions that are caused by the change in the political environment. Firstly, the political atmosphere is influenced by the lobbyist that makes the change happen for some actor in favourable fashion. The new atmosphere was formed in the case of renewable diesel fuels by the introduction of RED and RED2 in by the European Union governance.

Secondly, as the targets in the proportions of renewable diesel were increased, the market shifted to favouring and anticipating the most agile producers to distribute the good. To answer to the changes in the market, the leading companies need to innovate and form new ways to achieve the additional value brought by the new type of market by developing the business models to cover the challenges that were emerged by the new regulations and legislation.

To achieve the targets set by new models of making profit from the business sector new products or enhancements need to be developed by promoting the research and development inside the company operations. The products need to be financially and productionally feasible so that the shift would be as seamless as possible to sustain healthy finances of the company involved.

The assessment of how well the company have managed to make the shift and how financially sustainable the change has been is done by the investors and providers of equity. Also, to assess the product in terms of how usable it is, and how easy it is to be changed to from existing products, the customer behavior is vital. By ease of attracting customers to new product the company may establish a solid foundation to continue the process of normalize the product that follows the guidelines of the policies set by governing officials.

3. Methodology

The start of research for this paper defined the research problem which subsequently indicated the objectives of the research. The research problem is discussed in detailed matter in the introduction section of this paper. The objectives were set in a way that the existing research on this topic could have been used in the most efficient fashion. The existing research and information on this topic were essential factor in this paper´s research because the issue discussed concerns only a handful of producers and actors in the area of focus, Finland. The research questions were stated in the beginning of literature review.

The literature review focused on concepts and focused on experiences on previous cases from legislative environment. Choosing the suitable research method in the further stages of the study is essential for its success since the topic of this study is

complex, and has many different actors are embedded into factoring its future course of development in an emerging and uncertain field of business. Some of the issues with the topic were identified in the literature review but additional expertise and analyzation were needed to make conclusions. The readers of this paper should remind themselves that the indications and conclusions of this research are conducted by the limits of Bachelor´s Thesis research limits.

3.1 Choice of Method

Due to the extensive expertise needed to understand the parameters of the topic that were studied combined with a tight timeline of the research, the research had to exclude the option of using quantitative approach in defining the primary issues of this topic. The parameters include the regulatory decision-making process in which the effects on the behaviour that is being precluded are combined on the effects on industrial operators to find the most suitable solution. Although quantitative approach may have had more credible and definitive result, the research was conducted with a qualitative approach where an expert was interviewed with extensive question set. The interview was incorporated with an outlook of press releases and reports about the company of the case study Neste.

The question set was sent to the participant in advance. The preparation allowed the participant to organize their answers and make notes for the actual interviewing occasion. It may have caused an intensifying effect on the answers in terms that the interviewee was not surprised by the questions or something that were to be said were left out. On the other hand, the interviewee had chance to structure their answers to the way that is beneficial for them, especially in the case of company representative. The qualitative approach was chosen so that the phenomenon could be examined in more detailed way on the basis of answers from person who are knowledgeable and educated about the topic in question.

3.2 Research design and sample selection

The research questions of this paper required elaborative and non-fixed answers of the themes in the scope of this research. Therefore, in addition to a broad framework that was introduced in the literature review, a qualitative approach was chosen to be the basis of the research conducted for this study. The approach for the interview was chosen to be semi-structured to collect the data. The questions offer an extensive and elaborative basis for the qualitative research. The interviewee was chosen to be a specialist from the Ministry of Economic Affairs and Employment on the EU directives that affect the industry in question.

To study the topic in the context of Finnish oil refinery and distribution sector, publications and annual reports from Neste were used to form a case-like environment for the research. Also, news articles from known Finnish newspapers were used to ensure a collective and objective approach to the topic.

For further research, the sample size ought to be larger to ensure more reliable and structured results. More companies ought to be studied to show impacts of regulatory environment on smaller companies in addition to the largest actors in the sector. The data of the companies could also be collected by interviewing company representatives.

The sample chosen was aimed to reach a small number of attendees to highlight the role of Neste as one of the leading companies in the heavily changing industry of oil refineries. The data on Neste were collected from their press releases and annual reports, but also newspaper publications. So that the research wouldn´t be only reliant on information from a company that has its own predictions and expectations for the future marketplace and customer base for renewable diesel fuels, the Ministry of Economic Affairs and Employment was consulted on the matter. However, the interviewee from the Ministry of Economic Affairs and Employment is not able to react on the topics of organizational transformation caused by the regulations introduced by

the EU since their operations do not follow any productional standards or is not affected by the regulations in other operational way. They are the institution that implements the EU directives of this matter into the Finnish legislation and therefore they are very knowledgeable and reliable in terms of the ways of maximizing the effectiveness of regulations, but also they can provide essential information from previous studies about the renewable energy sector which includes the renewable diesel fuels.

The interview was conducted with telecommunication solutions because of time limitations from the parties involved. The interview lasted approximately an hour. The data was collected in English by audio recording to be employed in the analysis part of this study. The person that was interviewed had nationality of Finnish. The interviewee was contacted by searching for recommendations from organizations that are involved with renewable energy sector.

Name of the interviewee	**Job title**	**Institution**	**Role in the market environment**
Harri Haavisto	**Senior Specialist**	**The Ministry of Economic Affairs and Employment, Energy Department, Renewable energy unit**	**Regulator, responsible for preparing legislation proposals related to the RED2 implementation in Finland**

Figure 2 Interviewee Description

3.3 Analysis of Qualitative Research Responses

The method of analysis of the data collected from the interview was chosen to be to go over the audio files by transcribing to identify the parts that would be most influential for the research. The transcriptions were written to Word Documents following the exact wording of the interviewee. The analysis of the data was conducted by going through and comparing the answers with the data collected from Neste. All the questions are not included in the detailed analysis but all of those that brought additional value to the research were used. The responses were used as the basis of the analysis and the discussion and the points were enhanced with the evidence collected from company operations.

4. Findings and analysis

This section summarizes the main points of the interview and makes supportive claims with the aid of Neste´s annual reports and publications. Also, some of the claims are supported on the news articles in question. The data was analysed as explained in the section 3.3**.** The template for the interview may be found in the Appendices in the form as presented to the interviewee.

The first section explores the effect of quota obligation, also known as distribution obligation system, set by the government to reach the targets set by the EU. The quota obligations are perceived as the most important regulatory tool for increasing the proportion of renewable diesel fuels. Also, the future of quotas will be discussed.

Secondly, the supporting actions of governments are discussed from the point of view of the Ministry of Economic Affairs and Employment, since they are the actor in Finland who decide in the tools that are used to encourage development in sectors in question.

Thirdly, the non-regulative factors of changes in demand are discussed in short as it is an essential point in the end game for the regulators, even though the scope of this research studies the role of regulations in changing demand.

4.1 The Effect of quota obligations on demand of renewable diesel oils

Quota obligation system is a regulatory tool for governments to ensure that the companies will follow the guidelines or otherwise can be fined for not complying with the quotas. The Renewable Energy Directives move the market towards more restrained fashion. The regulations in form of quota obligations set by the government of Finland following the EU directives have been seen as very useful and efficient type of actions for changing market towards more environmentally friendly. The obligations do affect all the companies that are distributing fuels. The companies that are successful in production of the renewable fuels that are counted towards the quota will have financial advantage by lower production costs or by being able to sell these fuels to those companies that need it. The companies possessing developed production facilities will become providers of goods for their closest competitors in the sector of fuel distribution in Finland.

According to Helsingin Sanomat article (Elonen, 2020) the current obligations for the distributors in Finland obligate to reach 20% renewable fuels of all fuels sold, including petrol and diesel. Because petrol engines can endure less the renewables, selling renewables for diesel use gets leverage. They add, that at the moment other distributors than Neste need to buy renewables from Neste to reach the quota obligations.

Only Neste has the capacity to have excess renewables from their own sales and therefore, they have the competitive advantage which is boosted by the quota obligation system. The company stated in their annual report of 2019 that “regulations have paved the way for us to launch Neste MY Renewable Diesel in the Netherlands” (Neste, 2020a). The regulations have followed the same directives in Netherlands as

in Finland, so it can be said that the business models of Neste have been successful also there. As the companies must move towards biofuel market, the demand is in essence following the supply.

- “Basically, if we look at the quota obligation system, people do not have to make the decision of consuming, it is already decided by the government. If you go to petrol station to buy fuel, the share of biofuel is already there because of the obligation set to the companies. That is why the quota obligation system works really well and there is no question if we will achieve the targets, and the companies have to go to the biofuel market” (Haavisto, 2020a).

In terms of numerical change, the MEAE estimates that “in 2020 the estimation in EU28 countries is that demand of biofuels is 28 million tons of oil equivalent and this will increase 49 million by 2030. [In Finland], the current production capacity of biofuels is around 535 kilotons of oil equivalent and it has been estimated that the need of biofuels will increase to 800 kilotons by 2030” (Haavisto, 2020a). As the demand increases, the market and the distributors are more and more reliable on the producers that are capable on the large-scale production. As of now, Neste is encouraged to keep investing in new production facilities. In total, the renewables account for 70% of the profits of Neste (Rosendahl, 2020). It is to be forecasted that if the quota obligations will continue increasing as the figure 3 implicates that the financial benefits for Neste will continue increasing at sustainable pace from regulatory point of view. The fuels that are produced by Neste are so called advanced biofuels and therefore were counted as double of value in the quota compared to normal biofuels during RED1 until the year 2020. The double counting is being removed for the RED2 implementation which will affect the demand by increasing it between years 2021-2030.

In Finland, the MEAE is starting to renew the quota obligation system on the basis of RED2 and its regulations that are put in force step by step throughout the period from 2020 to 2030 as shown in Figure 3. The quota obligation system may get more

possibilities in terms of different goods that are counted towards the quota, such as biogas and synthetic fuels but is still under the process (Haavisto, 2020a). Alternative products for renewable fuels are perceived also worth investing in. For instance, Neste recently made an investment in a German company Sunfire that is specialized in synthetic fuels and hydrogen as an alternative in energy production (Neste, 2020b).

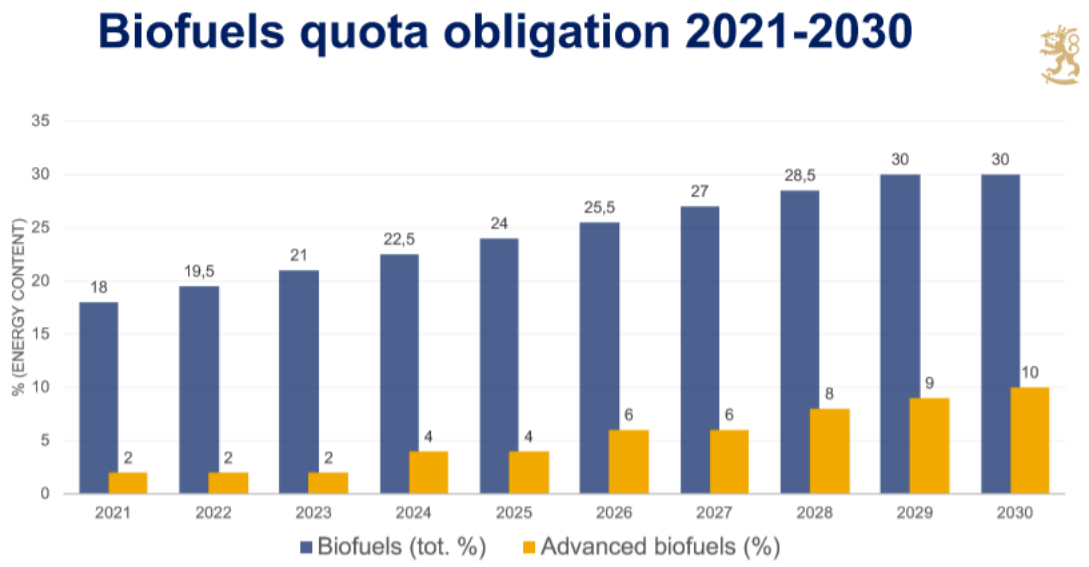

Figure 3. *Haavisto, H., 2020.* Policy Update Finland – Implementation Of The RED II.

4.2 Quotas offer business opportunities as those spread to new sectors

The quota obligations are at the moment mainly focused on transportation on land, but it has opportunities to work also in aviation sector. The technology has developed to the level in which for example Neste started a collaboration in March 2020 with a Finnish airline Finnair to start implementing biofuels in the everyday operations. Neste is also collaborating with for example with Lufthansa. The decision may have been a predictive move to cope with the changes in the aviation sector with quota obligations.

- ” What will happen to the renewable diesel market in the future, I see one big factor that is the aviation sector. More and more countries are introducing quota obligations for biofuels also in aviation. For example,

Sweden and France have proposed this already. Also, there is in our [Finland´s] government program a target that we should aim to 30% biofuels in aviation by 2030, and this work will start during this year in Finland." (Haavisto, 2020a)

The future market of biofuels for aviation has been declared as one of the targets of business development for Neste. The CEO Peter Vanacker stated in his review for the year 2019 that they have "moved from feasibility to execution and ramped up capacity to produce up to 100,000 tons of renewable jet fuel. With further production expansion on the way, we will have the capacity to produce over 1 million tonnes of renewable jet fuel globally by 2022" (Neste, 2020a). As the quota obligations are establishing to the aviation sector, it is safe to expect that the effects of it will be close to the effects to renewables for road transport. Still, as more producers emerge the competitive advantage over other jet fuel distributors may not be as radical as in road transport.

4.3 Supportive measures from governments pave the way towards free competition

The supportive measures offered by the states are still needed to give companies enough financial reasons to start innovating and accessing new markets and product lines. The advantages that the renewables offer are not limited to being able to sell products to straight competitors to meet the quotas. The government is also offering supportive aids to the companies that thrive towards meeting the member state´s collective goal of increasing the proportion of biofuels used in the transportation. The MEAE sees that the aids are still essential to ensure that the development continues, and investing does not cool down.

- "At the moment renewables are more expensive than the traditional products so they usually need some kind of compensation, tax exemptions or investment aids for the new technology. In the long run we are hoping that we are moving to free competition, but we are not here yet. What we can do for the high production costs of renewables is to facilitate the

> advanced biofuels and encourage R&D and experience from current projects. One factor is carbon price, if that continues to go up, of course it is good for the renewables." (Haavisto, 2020a)

Haavisto (2020a) refers to the carbon price, which relates to the distribution obligation system. The companies that are not able to reach the amounts of renewables that are required based on the quotas, can buy rights to fall short on the quotas. If the price of rights increase but production costs of renewables stay low for some companies, those companies can sell their excess products at price close to the price of rights. The increasing price of the rights is ensured if using supply and demand theorem since the amount of rights is continuously decreased.

The aids may not continue to boost the sales and production for too long in the future as the transformation towards normal market conditions is occurring. For example, the tax exemptions in Finland are being reduced by 120 million at the latest by 2023. (Ovaskainen, 2020) Reducing incentives in emerging markets will bring out new uncertainties. The sudden policy changes in taxation and aids will affect negatively the willingness to invest in production and research through uncertainty about the future.

4.4 Regulating diminishes the uncertainty

As the companies can predict the regulatory behaviour of the government because of the long-term targets, the environment for investment decisions is easier and causes less risk. The uncertainty of biofuel sector has been connected to the uncertainty of decisions of regulators. To ensure the continuity of research and development in this sector, the government is aiming to give such guidelines that those can be leaned on for the foreseeable future. For instance, in this case the uncertainty considers the issue on classification of the permitted sources of ingredients for biofuels and what will be the goal for quota for biofuels in 2050. Still, the supportive efforts from the government are under stress of budget deficits incurring in Finland. The uncertainty of the aids can

be diversified by using long-term trajectories in how the demands will change in terms of quota obligations.

- “Regulatory uncertainty turns out the most important factor that hampers the investment but after Renewable Energy Directive two we have vision to 2030 and especially in Finland we have set legislation that reaches to 2030 and the same was with 2020 targets. Companies get clear vision how we proceed from 2020 and now they know how we will proceed to 2030, so they got the long-term view of upcoming biofuel [regulatory] demands in Finland.” (Haavisto, 2020a)

- *Would you say that the environment for investments would be encouraging because of knowing what will happen?*

- Definitely, that has been one major target and plan why we already have set the target for 2030 that the companies can make investment decisions and they know the future market at least in Finland till 2030.” (Haavisto, 2020a)

Neste sees the problems in business environment the same as the MEAE. The environment for investments and continuity of business in the renewables has been affected by the political uncertainty. Neste acknowledges that “Brexit and other economic and political developments in EU countries may impact the market conditions for the supply of feedstock and sales of refined products” (Neste, 2020a).

In addition to external economic and geopolitical risks they acknowledge the effect of risk of laws and regulation. They state that “for the renewable products, a significant source of uncertainty is fragmented regulation around acceptability and use of waste & residue feedstock” and “changes in regulation especially in the European Union and the United States may influence the speed at which the demand for renewable

products develops, and new raw materials sources are taken into use" (Neste, 2020a).

The developments in the sector may be hampered by political changes, such as rise of more conservative and nationalist parties that are willing to boost the local production and industries by loosening the regulations related to the environmental goals. This could lead towards diminishing market share of renewables since the production costs are higher than of the traditional energy sources, and governmental aid for research and development regarding the renewable diesels and other energy sources should be significantly lower. On the other hand, as peak oil has been reached and the shift from crude oil to environmentally friendlier alternatives is inevitable, the changes in politics will be short-term.

The future regulatory frameworks are in interest of the companies involved. With the environmentalist atmosphere amongst many different decision makers, the environment for business for Neste as one of the largest renewable fuel producers is encouraging. In fact, Neste hopes that the regulatory frameworks are implemented as ambitious and to aim to reduce as much emissions as possible since it will give boost for their business in the area in question (Neste, 2020a). For example, in Finland the regulations and quotas are implemented in a way that the directives of the EU have smaller obligations. As an indication, the target for EU renewable energy sources consumption is 32% by 2030 as Finland´s target is 50%. In transportation the figures are 14% and 30% respectively. As seen in the Figure 3, the proportion of advanced biofuels is growing to 10% and those are not double counted.

4.5 Non-regulative factors towards demand

The demand for renewable diesel oils is not affected solely by the quota obligation system but also because of the trend of environmental sourcing and consumption. The market for pure renewable diesel oils is recognized also to be demanded. For example, Neste has increased the number of fuel stations that offer the Neste My Renewable Diesel to over 70. The MEAE has also recognized the trend in transportation.

- ”Of course, in general the environmental awareness has raised and people are more and more worried about the climate change and global warming and people are choosing more environmentally friendly products also because they want to consume these kinds of products. Good example is Neste MY renewable diesel that is already sold here in Finland, it costs around 10 or 15 cents more than the fossil diesel being 100% renewable. People want to buy this product even though it is more expensive, so it is a trend that consumption to more environmental friendly products in general.” (Haavisto, 2020a)

- *”So, would you say that there are also other factors than the directives in terms of market change?”*

- ”Definitely yes, I think that how people make their decisions of what they want to use and what kind of products they want to buy. There is definitely risinig role with the ecofriendly production and we are moving towards fossile free.” (Haavisto, 2020a)

The environmental trends are important to remember as an essential factor in the rise of demand. The two, policies and changing consumer behavior combined will be increasing the demand for renewable paraffine diesel oils at least up until 2030 while boosted with the quota obligation of RED 2. Still, Haavisto states that renewable diesel will not become the market leading product in transportation.

- “It is hard to see that renewable diesel would become market leading product in transportation, excluding the heavy-duty export. Amount of diesel cars is decreasing at the moment, and at the same time alternative solutions are increasing, and in general the directive promotes not just the biofuels but also other renewables. So, there is no reason to focus only on renewable diesel in the big picture. In general, we agree that we need all possible means to decrease emissions in transport sector and this includes for

example biofuels, and also synthetic fuels in the future, electric vehicles and energy efficiency.” (Haavisto, 2020a)

However, it has been seen that renewables can be major source for income for the main companies in the field, such as Neste who by investments show that they seek for alternative ways to reach customers in the sector of renewable energy sourcing.

5. Discussion

In this chapter, the objectives of the study are discussed whether those were met and if not, then also why not. After seeing the objectives through the limitations of the research will be discussed.

5.1 Research objectives

This study was set to address the research objectives which were:

1. To identify the ways in which directives affect the company operations.
2. To identify how companies are able to exploit the regulations and turn it into advantage and draw conclusions to be used in the scale of industry.

The objectives were in general successfully met and the research was able to give answers in a suitable fashion. The interview formed the basis for filling the blanks that the literature review left. Deeper knowledge about the quota obligation system that is in use in dealing with the problem of enlarging the supply and demand for biodiesels were acquired from the interview conducted. Also, to see the side of governing organ and its goals in the development of the business world was influential in the research.

The side of company publications and news articles gave the confirmation and to some extent the acceptance for the operations of the Ministry of Economic Affairs and Employment. The data collected was essential for meeting the objectives since the literature that considered particularly the RED2 was limited since it will come into effect at the end of year 2020. It also came into light that the REDs are not the only tools that

are used to decrease emissions in the EU states which would not have been found without the primary data collection.

5.2 Limitations

The limitations of this thesis divide into two different sections. The first limitation is that many of the topics discussed follow the flow that were dictated by the MEAE since they were the only actor that were interviewed, and they were the source of most of the primary data. Still, the guidelines were set in the form of interview template, so the effect was not that significant on the end-result of the study. For further research, the interviews should be extended to fields of companies and organisations for the industrial and labour market policies in energy sector.

Also, to take into account only the market for renewable fuels in transportation in Finland is a small sample of markets in the EU while the directives are designed for all the markets. Some of the effects may have been caused by the acts set by Finland and may not be caused by the REDs. Local clientele and large producer could also be part of the reasons why the regulations seem to have worked so well in Finland. Therefore, all the repercussions on market outlook of renewable diesel oils should not be assumed as caused by directives but also external reasons.

6. Conclusions

6.1 Main findings

The main finding of the research is that the directives of this scale as the REDs that obligate the companies to adapt with the threat of fines offer a suitable environment for changing the behaviour of the companies. Only the fines are not enough to ensure the transformation but with introducing sufficient incentives for the companies lead to industrywide change. In the case of Neste, they have reached the point where the demand for their products come from their existing customers but also those competitors that have not been able to be as agile in the productional and

organizational transformation. As the demand for advanced biofuels is ensured to grow at least for the next ten years because of the new quota obligations the environment for investing into new production facilities is encouraging.

The long-term knowledge about the market development and its requirements combined with tax exemptions and investment aids has boosted the development of the industry in Finland. The quotas and emission reduction targets are set to more ambitious levels in Finland and it has enabled the development to be faster than in other European countries. In Finland, reduction of the supportive policies have started which indicates that the sector is starting to become market based and needs less and less governmental aid. Strong governance has ensured that the sector has developed faster through its development circle than most European countries after the introduction of the obligations of Renewable Energy Directives.

6.2 Implications for International Business

The problem of climate change is worldwide and needs to be acknowledged in all of the economies. Transportation is responsible for a large portion of all the emissions and new solutions there are an effective way to reduce overall pollution. The environmental movement is roaring, and the fossil resources are scarce.

Business possibilities are evident as seen in the case of Neste. The most innovative companies can start to produce alternative choices for the traditional fossil fuels and start to profit from it. The example of Finnish ambitious regulating performed by the government shows that in the EU the nations individually may facilitate more ambitious measures to their own legislation that is required and also benefit from it. Obviously, the same results may not replicate but the precedence is visible.

6.3 Suggestions for Further Research

The lack of definite results from the data extraction is a problem for the definitiveness and accuracy of the results presented. The interviewing method in its free form may

have room for wiggle and some essential factors may have been left out. The implications for the smaller operators was excluded completely in the observation on Neste and should be evaluated as own entity. Also, as the market for renewables is diversifying to other sectors, such as aviation, and the incentives are being reduced, the market development could be researched on after the changes see how those affect the company transformation cycle.

Also, the sample size and targeting ought to be broader. By selecting more companies to look into and finding their side of the effects of the regulations a more extensive picture could be formed. The companies could also be examined through interviews so that the information sourcing would be equal.

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APPENDICES

Appendix 1

The Interview Template

Can you describe your role in your workplace?

What is your workplace´s role in terms of Renewable Energy Directive adoption in Finland?

What kind of organisational steps were taken after the introduction of first RED in terms of its adoption?

How much resources were reserved for the organisational transformation?

How remarkably did the renewable diesel market change from your perspective after introduction of the first Renewable Energy Directive?

Do you feel that renewable diesel oils have the ability to be mass produced and be profitable?

What would secure profitability of renewable products, governmental incentives or free competition between traditional and renewable oil products?

In your opinion, what are the major barriers for large scale adoption of renewable diesel oils?

In your opinion, do the Renewable Energy Directives promote renewable diesel oils enough to become market leading product in transportation? Do Directives offer enough measures to achieve this?

What kind of changes in business model (e.g. in earning logics, value creation networks, new competences, investments) are required from companies after the introduction of such industry changing policies?

Would the market have changed towards renewables in transport in such manner without directives set by EU? Why?

How do you see investor and consumer expectations in comparison with actual market development in terms of market share of renewable diesel fuels?